

ABSTRACT

A composite structural laminate plate suitable for building maritime vessels or for building civil structures such as double hull oil tankers, bulk carriers, barges decks for roll-on roll-off ferries, orthotropic bridge decks or for building any structural application in which the traditional method of construction uses stiffened steel plates. The laminate has two facing metal layers that are structurally bonded to a polyurethane elastomer core which may have steel or rigid foam void sections embedded within. The laminate provides equivalent inplane and transverse stiffness and strength, reduces fatigue problems, minimizes stress concentrations, improves thermal and acoustical insulation, and provides vibration control. The laminate provides a structural system that acts as a crack arrest layer and that can join two dissimilar metals without welding or without setting up a galvanic cell. For applications like double hull oil tankers, the structural system provides an impact resistant structure that isolates the innermost hull skin from cracks, thereby preventing a loss of cargo such as oil into the environment, when accidental or groundings occur and the outer hull is pierced, penetrated, or ruptured.